

CLAIMS

1. A substantially purified or isolated nucleic acid or nucleic acid fragment encoding a condensed tannin biosynthetic enzyme selected from the group consisting of chalcone synthase (CHS), CHS-like, dihydroflavonol 4-reductase (BAN), BAN-like, leucoanthocyanidine reductase (LAR) and LAR-like, or a functionally active fragment or variant of such a polypeptide, from a clover (*Trifolium*), medic (*Medicago*), ryegrass (*Lolium*) or fescue (*Festuca*) species.
2. A nucleic acid or nucleic acid fragment according to Claim 1, wherein said nucleic acid or nucleic acid fragment is from white clover (*Trifolium repens*) or perennial ryegrass (*Lolium perenne*).
3. A nucleic acid or nucleic acid fragment according to Claim 1, encoding a CHS polypeptide or CHS-like polypeptide and including a nucleotide sequence selected from the group consisting of (a) sequences shown in Figures 2, 6, 10 and 14 hereto (Sequence ID Nos. 1, 3, 5 and 7, respectively); (b) complements of the sequences recited in (a); (c) sequences antisense to the sequences recited in (a) and (b); and (d) functionally active fragments and variants of the sequences recited in (a), (b) and (c); and (e) RNA sequences corresponding to the sequences recited in (a), (b), (c) and (d).
4. A nucleic acid or nucleic acid fragment according to Claim 1, encoding a BAN polypeptide or BAN-like polypeptide and including a nucleotide sequence selected from the group consisting of (a) sequence shown in Figure 18 hereto (Sequence ID No. 9); (b) complements of the sequence recited in (a); (c) sequences antisense to the sequences recited in (a) and (b); and (d) functionally active fragments and variants of the sequences recited in (a), (b) and (c); and (e) RNA sequences corresponding to the sequences recited in (a), (b), (c) and (d).
5. A nucleic acid or nucleic acid fragment according to Claim 1, encoding a LAR polypeptide or LAR-like polypeptide and including a nucleotide sequence selected from the group consisting of (a) sequences shown in Figures 22, 26 and 30 hereto (Sequence ID Nos. 11, 13 and 15, respectively); (b) complements of the sequences recited in (a); (c) sequences antisense to the sequences recited in (a) and (b); and (d) functionally active fragments and variants

of the sequences recited in (a), (b) and (c); and (e) RNA sequences corresponding to the sequences recited in (a), (b), (c) and (d).

6. A construct including one or more nucleic acid or nucleic acid fragments according to any one of claims 1 to 5.

5 7. A construct according to claim 6 including nucleic acids or nucleic acid fragments encoding both CHS or CHS-like and BAN or BAN-like polypeptides.

8. A construct according to claim 6 including nucleic acids or nucleic acid fragments encoding both CHS or CHS-like and LAR or LAR-like polypeptides.

10 9. A construct according to claim 6 including nucleic acids or nucleic acid fragments encoding both LAR or LAR-like and BAN or BAN-like polypeptides.

10. A construct according to claim 6 including nucleic acids or nucleic acid fragments encoding all three of CHS or CHS-like, LAR or LAR-like and BAN or BAN-like polypeptides.

15 11. A construct according to any one of claims 6 to 10 wherein the one or more nucleic acids or nucleic acid fragments are operably linked to one or more regulatory elements, such that the one or more nucleic acids or nucleic acid fragments are expressed.

20 12. A construct according to Claim 11, wherein the one or more regulatory elements include a promoter and a terminator, said promoter, nucleic acid or nucleic acid fragment and terminator being operatively linked.

13. A plant cell, plant, plant seed or other plant part, including a construct according to any one of claims 6 to 12.

25 14. A plant, plant seed or other plant part derived from a plant cell or plant according to Claim 13.

15. A method of modifying one or more of condensed tannin biosynthesis; protein binding, metal chelation; anti oxidation; UV-light absorption; pigment production; or plant defence to a biotic stress; in a plant, said method including introducing into said plant an effective amount of a nucleic acid or 30 nucleic acid fragment according to any one or claims 1 to 5 or a construct according or any one of claims 6 to 12.

16. A method according to claim 15 wherein said method includes introducing into said plant effective amounts of nucleic acids or nucleic acid fragments encoding both CHS or CHS-like and BAN or BAN-like polypeptides.

17. A method according to claim 15 wherein said method includes
5 introducing into said plant effective amounts of nucleic acids or nucleic acid fragments encoding both CHS or CHS-like and LAR or LAR-like polypeptides

18. A method according to claim 15 wherein said method includes introducing into said plant effective amounts of nucleic acids or nucleic acid fragments encoding both LAR or LAR-like and BAN or BAN-like polypeptides.

10 19. A method according to claim 15 wherein said method includes introducing into said plant effective amounts of nucleic acids or nucleic acid fragments encoding all three of CHS or CHS-like, BAN or BAN-like and LAR or LAR-like polypeptides.

20. A method according to any one of claims 15 to 19 wherein the
15 method is modifying plant defence to biotic stress and the biotic stress is selected from the group consisting of viruses, micro-organisms, insects and fungal pathogens.

21. A method of modifying forage quality of a plant by disrupting protein foam and/or conferring protection from rumen pasture bloat, said method including
20 introducing into said plant an effective amount of a nucleic acid fragment according to any one of claims 1 to 5 or a construct according to any one of claims 6 to 12.

22. A method according to claim 21 wherein said method includes introducing into said plant effective amounts of nucleic acids or nucleic acid
25 fragments encoding both CHS or CHS-like and BAN or BAN-like polypeptides.

23. A method according to claim 21 wherein said method includes introducing into said plant effective amounts of nucleic acids or nucleic acid fragments encoding both CHS or CHS-like and LAR or LAR-like polypeptides

24. A method according to claim 21 wherein said method includes
30 introducing into said plant effective amounts of nucleic acids or nucleic acid fragments encoding both LAR or LAR-like and BAN or BAN-like polypeptides.

25. A method according to claim 21 wherein said method includes introducing into said plant effective amounts of nucleic acids or nucleic acid fragments encoding all three of CHS or CHS-like, BAN or BAN-like and LAR or LAR-like polypeptides.
- 5 26. Use of a nucleic acid or nucleic acid fragment according to any one of claims 1 to 5, and/or nucleotide sequence information thereof, and/or single nucleotide polymorphisms thereof as a molecular genetic marker.
- 10 27. A substantially purified or isolated polypeptide from a clover (*Trifolium*), medic (*Medicago*), ryegrass (*Lolium*) or fescue (*Festuca*) species, selected from the group consisting of CHS and CHS-like, BAN and BAN-like and LAR and LAR-like; and functionally active fragments and variants thereof.
28. A polypeptide according to Claim 27, wherein said polypeptide is from white clover (*Trifolium repens*) or perennial ryegrass (*Lolium perenne*).
- 15 29. A polypeptide according to Claim 27, wherein said polypeptide is CHS or CHS-like and includes an amino acid sequence selected from the group consisting of sequences shown in Figures 3, 7, 11 and 15 hereto (Sequence ID Nos. 2, 4, 6 and 8, respectively); and functionally active fragments and variants thereof.
- 20 30. A polypeptide according to Claim 27, wherein said polypeptide is BAN or BAN-like and includes an amino acid sequence selected from the group consisting of sequence shown in Figure 19 hereto (Sequence ID No. 10); and functionally active fragments and variants thereof.
- 25 31. A polypeptide according to Claim 27, wherein said polypeptide is LAR or LAR-like and includes an amino acid sequence selected from the group consisting of sequences shown in Figures 23, 27 and 31 hereto (Sequence ID Nos. 12, 14 and 16, respectively); and functionally active fragments and variants thereof.